## ABSTRACT

Methods, systems, and apparatus consistent with the present invention use a beam of laser energy to concentrically form an optical preform from two or more concentric glass objects, such as two glass tubes or a hollow glass tube and a solid glass rod. The glass objects are placed in a concentric configuration where the outer object has an inner surface that is placed proximate to an outer surface of the inner object. Once these are assembled, a beam of laser energy is generated, positioned, and applied to a starting point in the gap defined by the inner surface and the outer surface. Once the laser beam is applied and is reflecting down into the gap, the beam of laser energy is moved relative to the starting point as the beam is concurrently applied. This heats the inner surface and outer surface so that the two objects can be joined to form the optical preform. In another aspect of the invention, a coating layer is disposed within the gap and can be heated by the laser as it is applied within the gap. Such heating of the coating layer causes thermal diffusion of the coating layer into at least one of the glass objects prior to fusing the glass objects together.

LAW OFFICES
FINNEGAN, HENDERSON,
FARABOW, GARRETT
& DUNNER, L.L.P.
3200 SUNTRUST PLAZA
303 PEACHTREE STREET, N.E.
ATLANTA, GEORGIA 30308
404-653-6400